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ABSTRACT

The early identification of students at risk of school failure and the development of strategies to improve their chances of success in school are important topics for researchers, policy makers, and educators. This report examines high school outcomes and determines, through data from the National Education Longitudinal Study of 1988, if any outcomes are related to risk factors that can be identified at the beginning of high school. "At-risk eighth-grade students were identified as those who: live in single-parent families; have family incomes of less than $15,000; have an older sibling who has dropped out; have parents who did not finish high school; have limited proficiency in English; or are at home without adult supervision more than three hours a day. About 26% of eighth graders nationally major finding is that of students identified as having multiple risk factors in eighth grade, only 60% graduated from high school on time, compared with 90% of students with no risk factors. Sixty-five percent of students with multiple risk factors failed to complete a basic sequence of high school courses. At-risk students were more likely to test poorly in mathematics, and they were more likely to report getting into trouble at school. Students with multiple risk factors in eighth grade were also more likely to have a child in 1992. Four figures and three tables present study findings. A brief appendix discusses methodology. (Contains eight references.) (SLD)

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Statistics in Brief

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"At-Risk" Eighth-Graders Four Years Later

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The early identification of students who are at risk of school failure, and the development of strategies to improve their chances of success in school, are important topics which intersect the interests of policy makers, teachers, and researchers. The purpose of this Statistics in Brief is to examine high school outcomes and determine empirically, through use of data from a national longitudinal study, if any are related to "risk" factors that can be identified at the beginning of high school. Major findings include:

- Among students identified as having multiple risk factors in eighth grade, only 60 percent graduated from high school on time, compared to 90 percent of students with no risk factors.
- Sixty-five percent of students with multiple risk factors failed to complete a basic sequence of high school courses compared to 37 percent of those with no risk factors.
- At-risk students were more likely than others to test poorly in mathematics. Over half (53 percent) of those with multiple risk factors were classified at the basic level, or below. In contrast, only 22 percent of those with no observed risk factors were classified at that level.
- Eighth-graders who had multiple risk factors in 1988 were more likely than others to have a child in 1992—19 percent compared to 5 percent.
- Students with multiple risk factors were more likely than others to report getting into trouble at school, being transferred or suspended for disciplinary reasons, being arrested, and being sent to a juvenile home or detention center.

The National Education Longitudinal Study of 1988 (NELS:88) provides data that can be used to investigate this topic. As part of this survey, a sample of students enrolled in eighth grade in 1988 were contacted in 1990 and again in 1992. The 1992 sample includes students who have continued in-sequence in school, those who have dropped out or fallen behind, and students who graduated early.

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Using these data, we can examine the relationship between the risk factors observed in eighth grade and a wide variety of academic and behavioral outcomes four years later.

In examining base-year data from NELS:88, researchers (Hafner, Ingels, Schneider, & Stevenson, 1990) identified six characteristics of eighth-grade students that previous studies suggested increased the risk of school failure (see for example, Pallas, Natriello, & McDill, 1989). "At-risk" eighth-grade students were identified as those who

- live in single-parent families;
- have family incomes of less than $15,000;
- have an older sibling who has dropped out;
- have parents who did not finish high school;
- have limited proficiency in English; or
- are at home without adult supervision more than three hours a day.

Approximately 26 percent of eighth-grade students had one of these characteristics and an additional 20 percent had two or more. Students with two or more of these risk factors were more likely than those with no risk factors to have low grades and perform poorly on a standardized test measuring eighth-grade achievement.

Two years later in the spring of 1990, when the majority of the eighth-grade cohort was enrolled in tenth grade, Scott, Rock, Pollack and Ingels (1995), assessed the predictive validity of the at -risk indicators examined in the base year. The factors used to classify at-risk students were found to be highly associated with actually dropping out of school. The incidence of dropping out of school was nearly eight times (15 percent) higher for those with two or more risk factors than it was for cohort members with no risk factors (2 percent).

The risk factors identified here are a small subset of those that can be examined; they were selected because of their use in past descriptive reports. However, a broader range of factors has been investigated. In an analysis of tenth-grade outcomes, Kaufman and Bradby (1992), identified several characteristics that were associated with a higher likelihood of dropping out or performing poorly in tenth grade. The eighth-graders who had dropped out by tenth grade or tested below basic proficiency levels in math or reading were students who were overage for their grade, frequently changed schools, had parents who were not actively involved or had low expectations, came unprepared for class or cut class frequently, were thought by teachers to be passive, disruptive, inattentive, or underachievers, or were from urban schools or schools with large minority populations.

The purpose of this Statistics in Brief is to examine 1992 outcomes and determine empirically which of them are related to the risk factors observed four years earlier. Using the same six at-risk indicators Hafner, Ingels, Schneider, and Stevenson (1990) used when examining the NELS:88 base-year data, this report examines how well eighth-graders classified as at risk in 1988 performed in a number of areas four years later.

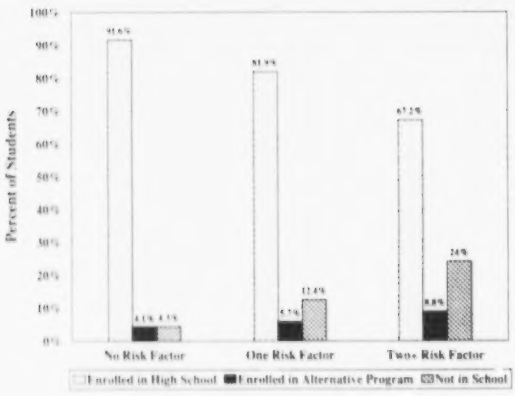
School Achievement. Figure 1 presents information about 1988 eighth-grade students' enrollment status in the spring of 1992 by the number of risk factors observed in 1988. Students who were identified as being at risk in eighth grade were more likely than others to be dropouts in the spring of 1992.

- Ninety-two percent of those with no risk factors were in school in 1992 compared to 67 percent of those with two or more risk factors.

- Four percent of students with no risk factors in 1988 were enrolled in alternative programs (e.g., GED programs) in 1992 compared to 9 percent of those with two or more risk factors.

- In the spring of 1992, four percent of students with no risk factors were dropouts; among students with two or more risk factors, 24 percent were dropouts.

Figure 1. Percent of 1988 Eighth-Graders Who Were Enrolled in High School, Alternative Programs, or Had Dropped Out of School in Spring of 1992

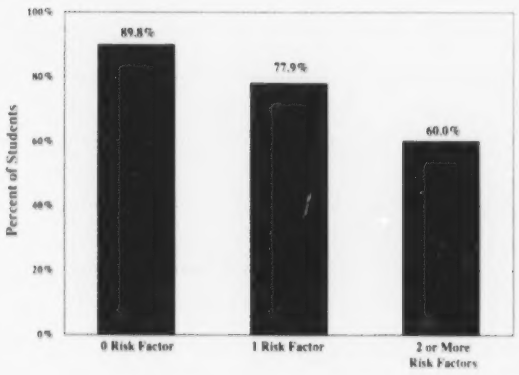


Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up.

This same pattern is reflected in Figure 2, which presents graduation rates at the end of the 1991–92 school year. Students who were identified as being at risk in eighth grade were less likely than others to graduate on time.

- Among students with no risk factors, ninety percent had earned high school diplomas by the end of spring term, 1992. Only 10 percent of this group failed to graduate from high school on time.
- Among students with multiple risk factors, the odds of graduation were much lower: only 60 percent earned their high school diploma by the end of the 1991–92 school year.

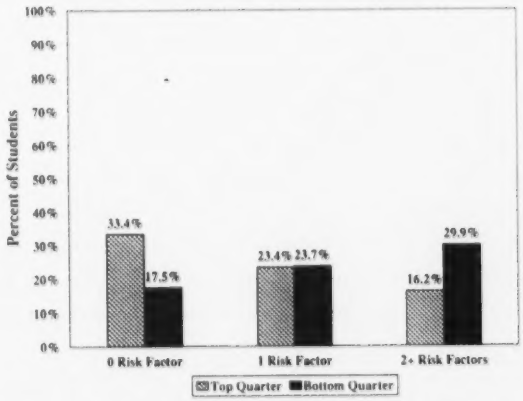
Figure 2. Percent of 1988 Eighth-Graders Who Had Received High School Diplomas by End of 1991-92 School Year



Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up.

Students with multiple risk factors were less likely than others to rank in the top quarter of their high school class. Figure 3 presents information on the percentage of 1988 eighth-grade students who ranked in the top and bottom quarter of their high school class. These data are taken from transcripts and indicate rank in class at last enrollment.

Figure 3. Percent of 1988 Eighth-Grade Students Ranking in Top and Bottom Quarters of High School Class, 1992



Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up.

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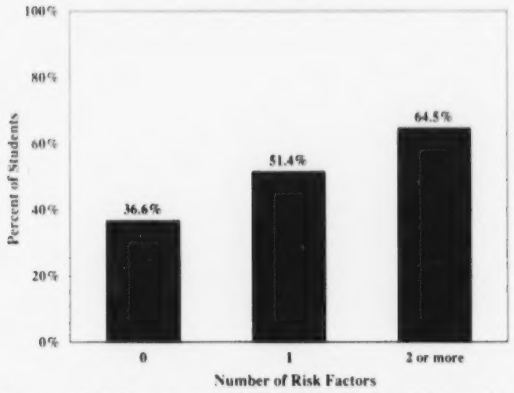
- One-third of the students with no risk factors ranked in the top quarter of their high school class compared to 16 percent of those with multiple risk factors.

At-risk eighth-grade students were also less likely than peers with no risk factors to complete a minimum standard of coursework that included four English, three social studies, two math and two science courses, as demonstrated in Figure 4.

- Sixty-five percent of students with multiple risk factors failed to complete a basic sequence of high school courses compared to 37 percent of those with no risk factors.

Figure 4. Percent of 1988 Eighth-Grade Students Who Did Not Complete 4 English, 3 Social Studies, 2 Mathematics and 2 Science Courses, 1992



Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up.

Tested Achievement. Table 1 presents information about subject matter proficiency levels as determined by the standardized tests administered in the NELS:88 Second Follow-Up.

Proficiency in reading is measured at three levels:

Reading Level 1: Simple reading comprehension including reproduction of detail or the author's main thought.

Reading Level 2: Ability to make relatively simple inferences beyond the author's main thought or understandand evaluate relatively abstract concepts.

Reading Level 3: Ability to make complex inferences or evaluative judgments that require piecing together multiplesources of information from the passage.

Mathematics proficiency is measured at five levels:

Math Level 1: Simple arithmetical operations on whole numbers: essentially single step operations which rely on rote memory.

Math Level 2: Simple operations with decimals, fractions, powers, and roots.

Math Level 3: Simple problem solving, requiring the understanding of low level mathematical concepts.

Math Level 4: Understanding of intermediate level mathematical concepts or having the ability to formulate multi-step solutions to word problems.

Math Level 5: Proficiency in solving complex multi-step word problems or the ability to demonstrate knowledge of mathematics material found in advanced mathematics courses.

Scientific knowledge is measured at three levels:

Science Level 1: Understanding of everyday science concepts, "common knowledge" that can be acquired in everyday life.

Science Level 2: Understanding of fundamental science concepts upon which more complex science knowledge can be built.

Science Level 3: Understanding of relatively complex scientific concepts; typically requiring an additional problem solving step.

- Approximately one in six (16 percent) adolescents with multiple risk factors were unable to comprehend basic written information, testing below the basic level in reading. In comparison, only about one in 20 (6 percent) of those with no risk factors were unable to demonstrate basic reading skills.

- At-risk students were more likely than others to test poorly in mathematics. About 14 percent of those with multiple risk factors were classified below the basic level. In contrast, only 5 percent of those with no observed risk factors were classified at that level.

- Nearly one-third (32 percent) of students with multiple risk factors could not demonstrate even a "common knowledge" of science. Only 12 percent of students with no risk factors failed to demonstrate this basic level.

Table 1. Test Achievement in 1992, by Number of Risk Factors Observed in Eighth Grade 1988 Eighth-Grade Cohort[1]

	0 Risk Factors	1 Risk Factor	2 or More Risk Factors
Percent of those in each risk group:			
Overall Reading Proficiency:			
Below Basic	5.6	8.7	15.8
Basic (Level 1)	27.2	37.6	42.3
Intermediate (Level 2)	40.4	36.8	32.1
Advanced (Level 3)	26.7	16.9	9.8
	100.0	100.0	100.0
Overall Math Proficiency:			
Below Basic	4.9	8.6	14.2
Level 1 (Arithmetic - whole numbers)	16.6	27.8	38.6
Level 2 (Arithmetic - decimals and fractions)	12.8	17.3	18.2
Level 3 (Simple problem solving)	25.3	22.3	17.2
Level 4 (Complex problem solving)	34.8	21.6	11.0
Level 5 (Advanced)	5.4	2.2	0.8
	100.0	100.0	100.0
Overall Science Proficiency:			
Below Basic	12.2	20.6	32.3
Basic (Level 1)	27.9	32.9	40.0
Intermediate (Level 2)	33.6	30.1	19.4
Advanced (Level 3)	26.3	16.4	8.3
	100.0	100.0	100.0

Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up surveys.

[1] Only approximately 50 percent of sampled dropouts completed the NELS:88 Second Follow-Up achievement tests. Because of missing data, especially missing test scores for those with two or more risk factors, the findings in this table may be biased. Since dropouts were more likely to possess multiple risk factors and fare poorly on tests, the relationship between risk factors and test scores may be understated. See the methodology section for an analysis of test nonresponse by risk factors.

In fact, looking at all subjects, the majority of the students identified as having multiple risk factors demonstrate proficiency at the basic level or below. The majority of students without identified risk factors demonstrate intermediate or advanced proficiency.

Social and Behavioral Outcomes. A number of other outcomes, often thought to be related to poor school performance, are examined in table 2. Again, each of these 1992 outcomes is looked at by the number of risk factors observed in 1988. Unlike the academic outcomes, some of the social and behavioral outcomes do not differ for students with multiple vs. no risk factors.

- Eighth-graders who had multiple risk factors in 1988 were more likely than others to have a child in 1992—19 percent compared to 5 percent.

- Students who had multiple risk factors in 1988 were no more likely than others to report using illicit drugs or abusing alcohol than those with no risk factors.

- At-risk students were no more likely than other students to report gang membership.

- Students with multiple risk factors were more likely than others to report getting into trouble over school rules, being suspended or transferred for disciplinary reasons, and being arrested or sent to a juvenile home or detention center.

Risk Factors and Proficiency in Eighth Grade. Clearly, the risk factors identified among this cohort of eighth-grade students affected academic outcomes. One of the questions to be addressed is whether **each** of these factors has some impact, or whether a single predictor might serve as well. Table 3 presents information about the impact of each risk factor on academic outcomes. Because previous research (Kaufman and Bradby, 1992) suggests that eighth-grade academic achievement has a powerful effect on future academic outcomes, the final column also presents information on students who tested below minimum proficiency levels, in any subject area, in eighth grade.

All of the risk factors identified in eighth grade are negatively associated with on-time graduation from high school, ranking in the top quarter of class, and completing the minimum recommended sequence of high school coursework.

Conclusion. Clearly, the characteristics that have been used to identify students at risk of school failure do predict later outcomes. These factors are strongly related to academic outcomes. However, they may not be related directly to other non-school outcomes, such as drug use or gang membership.

It is also clear that not all at-risk students fail. While the likelihood of finishing high school on time is far less for those students at risk, a majority (60 percent) did receive their high school diplomas in 1992. A number of factors, including student engagement and peer support affect student success (Finn, 1993). Perhaps the most interesting question for further research is to identify the home and school experiences that distinguish between at-risk students who succeed and those who do not. NELS:88 data include information from parents, teachers, and schools that can be used to address this question.

Table 2. 1992 Self-reported Behavioral Outcomes by Number of Risk Factors Observed in Eighth Grade 1988 Eighth-Grade Cohort

	0 Risk Factors	1 Risk Factor	2 or More Risk Factors
Percent of those in each risk group who report they:			
Have children	5.4	9.3	18.9
Used marijuana past year	18.8	17.8	20.4
Used cocaine past year	2.1	2.8	3.0
Had 5+ drinks in a row in past 2 weeks	28.5	30.2	28.6
Got into trouble over school rules	35.4	40.3	40.2
Received an in-school suspension	9.3	15.2	20.2
Suspended	6.7	10.1	16.9
Transferred for disciplinary reasons	1.4	1.7	3.2
Arrested	3.5	4.8	5.9
Sent to juvenile home or center	1.2	2.3	4.3
Gang member	3.2	3.7	4.1

Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up surveys.

Table 3. Transcript Indicated 1992 Outcomes by
Risk Factors and Proficiency Observed in Eighth Grade

	Single Parent		Parents have less than H.S. diploma		Sibling dropped out of H.S.		Home alone three or more hours/day		Limited English proficiency		Family income under $15,000		Tested below basic proficiency: 8th grade	
Percent of students:	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
H.S. Diploma Status														
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Received diploma	72.4	83.2	53.9	84.5	58.2	83.4	75.4	82.2	65.4	81.6	63.3	85.3	65.5	85.7
Have not received diploma	27.6	16.8	46.1	15.5	41.8	16.6	24.6	17.8	34.6	18.4	36.7	14.7	34.5	14.3
Class Rank														
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Top 25%	22.8	29.4	17.9	29.2	16.3	29.2	18.1	29.8	19.0	28.5	16.9	30.4	10.1	32.4
25-50%	21.8	27.2	22.5	26.6	23.1	26.5	27.3	26.2	19.4	26.4	26.3	26.3	18.6	28.0
50-75%	29.8	23.4	29.3	24.0	27.2	24.3	27.7	24.0	32.2	24.3	29.3	23.6	32.0	22.8
Bottom 25%	25.6	20.0	30.2	20.1	33.4	20.0	26.8	20.1	29.4	20.8	27.4	19.7	39.3	16.8
Completed Coursework														
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 4 English, 3 Social Studies, 2 Math and 2 Science	53.4	44.1	67.4	43.1	66.8	43.8	56.6	44.1	65.4	45.3	62.6	41.9	64.6	40.3
4 English, 3 Social Studies, 2 Math and 2 Science	20.2	19.4	16.1	20.0	17.6	19.7	18.4	19.7	12.0	19.7	18.6	19.8	17.8	20.0
4 English, 3 Social Studies, 3 Math and 3 Science	14.7	21.4	9.8	21.5	10.6	21.2	15.7	20.4	14.1	20.4	11.2	22.3	12.5	22.5
4 English, 3 Social Studies, 3 Math, 3 Science and 2 Foreign Language	11.7	15.0	6.6	15.4	5.0	15.3	9.3	14.6	8.5	14.6	7.7	16.0	5.0	17.2

Source: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study, 1988 (NELS:88); Base Year and Second Follow-Up surveys.

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Methodology

Overview of NELS:88 Study Design. NELS:88's major features include the integration of student, dropout, parent, teacher, and school studies; the initial concentration on an eighth-grade student cohort with follow-up at two year intervals; the inclusion of supplementary components to support analyses of geographically or demographically distinct subgroups; and the design linkages to previous longitudinal studies and other current studies.

The **base year** of the National Education Longitudinal Study of 1988 (NELS:88) represented the first stage of a major longitudinal effort designed to provide trend data about critical transitions experienced by students as they leave elementary school and progress through high school and into postsecondary institutions or the work force. This study of the 1988 eighth-grade cohort collects data about educational processes and outcomes pertaining to student learning, predictors of dropping out, and school effects on students' access to programs and equal opportunity to learn.

The **first follow-up** in 1990 provided the first opportunity for longitudinal measurement of the 1988 baseline sample. These data also provided a comparison point to high school sophomores ten years before, as studied in High School and Beyond (HS&B), as the sample was "freshened" to be representative of high school sophomores. The study captured the population of early dropouts (those who leave school between the end of eighth grade and the end of tenth grade), while monitoring the transition of the student population into secondary schooling.

The **second follow-up** took place in 1992, when most sample members entered the second term of their senior year. The second follow-up provides a culminating measurement of learning in the course of secondary school, and also collects information that will facilitate investigation of the transition into the labor force and postsecondary education after high school. (Freshening the NELS:88 sample to represent the twelfth-grade class of 1992 makes trend comparisons with the senior cohorts that were studied in NLS-72 and HS&B possible.) In addition to surveying the students who were in school during the first follow-up, the NELS:88 second follow-up resurveyed students who were identified as dropouts in 1990, and identified and

surveyed those additional students who left school after the first follow-up. The **third follow-up** took place in 1994. A fourth follow-up is scheduled for 1998.

Sample Used for Analysis. The NELS:88 contains five representative samples, three cross-sectional and two panel samples. The three cross-sectional samples are: 1988 eighth-graders, 1990 sophomores, and 1992 seniors. The two panel samples are: 1988 eighth-graders in 1990 and 1992 and 1990 sophomores in 1992. The analysis in this paper is based on data from the panel of 1988 eighth-grade students.

The eighth grade to second follow-up (1992) panel sample was used in the analysis of 1992 academic and behavioral outcome measures that were taken from cognitive tests or student/dropout questionnaires (tables 1 and 2). The eighth-grade panel sample is composed of members of the eighth-grade cohort who were retained in the first follow-up and who completed a base year student questionnaire, a first follow-up student or dropout questionnaire, and a second follow-up student or dropout questionnaire (sample N=16,489). The analyses employed the special panel flag (**F2PNLFLG**--for identifying members of the eighth-grade panel sample as of 1992) and the second follow-up eighth-grade panel weight, **F2PNLWT**. Both variables may be found on the NELS:88 second follow-up student data file.

Because the transcript survey sample is a subsample of the full second follow-up sample, the results presented in the figures and table 3 on academic outcome measures collected in the transcript survey used a slightly different eighth grade to second follow-up panel sample. This eighth grade to second follow-up panel sample is composed of sample members who were retained in the transcript sample and for whom transcript data were collected (N=14,283). These cases are identified using **F2TRP1FL**. To account for the additional subsampling in the transcript survey, analyses of the transcript-based eighth grade to second follow-up panel sample employed the panel-transcript weight, **F2TRP1WT**.

Non-response analysis reveals that students with risk factors were more likely than students with no risk factors to complete the proficiency tests given as part of NELS:

	Not Tested	Tested
No risk factors	78.1%	21.9%
One risk factor	70.9%	29.1%
Two or more factors	65.7%	34.2%

Variables Used. As in the base year report, *A Profile of the American Eighth Grader* (Hafner, Ingels, Schneider, & Stevenson, 1990), and the first follow-up report, *Two Years Later: Cognitive Gains and School Transitions of NELS:88 Eighth Graders* (Scott, Rock, Pollack & Ingels, 1994), the constructed variable, "at-risk," drew upon five base year student questionnaire items and one base year parent questionnaire item in its construction. The six base year items are:

(1) single parent family (BYFCOMP=4 or 5),

(2) parents with no high school diploma (BYPARED=1),

(3) a sibling who had dropped out of school (BYP6=one or more other children),

(4) home alone (in the base year) more than three hours a day (BYS41=4),

(5) limited English proficiency (BYLEP=1),

(6) income less than $15,000 (BYFAMINC less than or equal to $14,999),

Using the panel sample (n=16489), the weighted frequency for each risk factor is:

Single parent family - 17.5%

Parent did not complete high school - 10.7%

Sibling dropped out - 9.1%

Alone more than 3 hours/day, 1988 - 13.1%

Limited English proficiency - 2.3%

Low family income - 18.8%

Eighth-grade proficiency is measured using base year proficiency tests. Students who tested

below the basic level on any test were coded as "not proficient."

All outcome variables used in the analyses were taken directly from the second follow-up student and dropout questionnaire files or transcript file.

(1)Dropout status in 1992 is collapsed from F2DOSTAT (0,2=1; 3=2; 5=3)

(2)Graduation Status is collapsed from F2RREASL (1-3=1; 4-6,8,10-12=2; ELSE=MISSING).

(3)Class Rank is created from F2RRANK/F2RCSIZE.

(4)New Basic Coursework is the sum of F2RNWB3A +F2RNWB4A + F2RNWB5A.

(5)Twelfth-grade proficiency levels are from the student cohort file variables F2TXRPRO, F2TXMPRO, F2TXSPRO.

(6)Twelfth-grade behavioral outcomes as collapsed versions of variables:

Have children F2S76/F2D66

Used marijuana in past year F2S83B/F2D73B

Used cocaine in past year F2S84B/F2D74B
5+ drinks in a row, past 2 weeks F2S82/F2D72

School problems F2S9A-F2S9J/F2D19A-F2D19J

Gang membership F2S71/F2D61.

Statistical Procedures. Comparisons that have been drawn in the text of this report have been tested for statistical significance to ensure that the differences are larger than those that might be expected due to sampling variation. The statistical comparisons in this report were based on the *t* statistic. Generally, whether the statistical test is considered significant or not is determined by calculating a *t* value for the difference between a pair of means or proportions and comparing this value to published tables of values at certain critical levels, called "alpha levels." The alpha level is the probability that a difference of the size found would occur by chance. To guard against errors of inference based upon multiple comparisons, the Bonferroni procedure to adjust significance tests for multiple contrasts was used. This method corrects the significance (or alpha) level for the total number of contrasts made with a particular classification variable.

Standard errors for all tables are available by request. All standard errors were calculated using a Taylor series approximation to adjust for the effects of the complex survey design. The SUDAAN program was used. Because NELS:88 sampling employed a multi-stage stratified cluster design, the adjusted standard errors are generally higher than those that would be calculated using simple random sampling assumptions.

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